

LONG-TERM VARIATIONS OF GALACTIC COSMIC RAYS AND THEIR RELATION WITH THE SOLAR MAGNETIC FIELD PARAMETERS

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The paper deals with the relation of long-term variations of galactic cosmic rays (GCR) to the global solar magnetic field (GMF) and solar wind parameters. This study continues the series of work, where the tilt of the heliospheric current sheet (HCS) and other solar-heliospheric parameters are successfully used to describe long-term variations of cosmic rays in the solar cycles. The peculiarity of the present work is the use of the HCS tilt and other parameters reconstructed from H α observations of filaments for the period when direct GMF observations were unavailable. Our modulation model include index, which characterizes polarity variations of the GMF. We take into account both the direct effect of polarity on CR variations and its effect on CR modulation as the HCS tilt changes. The combined use of the source surface magnetic field and polarity variations of the GMF on the source surface in simulating of CR modulation allows us to improve model of CR long-term variations. The analysis of data for 1976 – 2000 revealed a good correlation (the correlation coefficient >0.95) between the solar-heliospheric parameters and GCR in different cycles of solar activity. Besides, the approach applied makes it possible to describe more accurately the behavior of cosmic rays in the epochs of solar maxima, which could not be done before. This indicates both the adequacy of the model and reliability of the reconstructed GMF parameters.